(54) Title: A TRADING SYSTEM
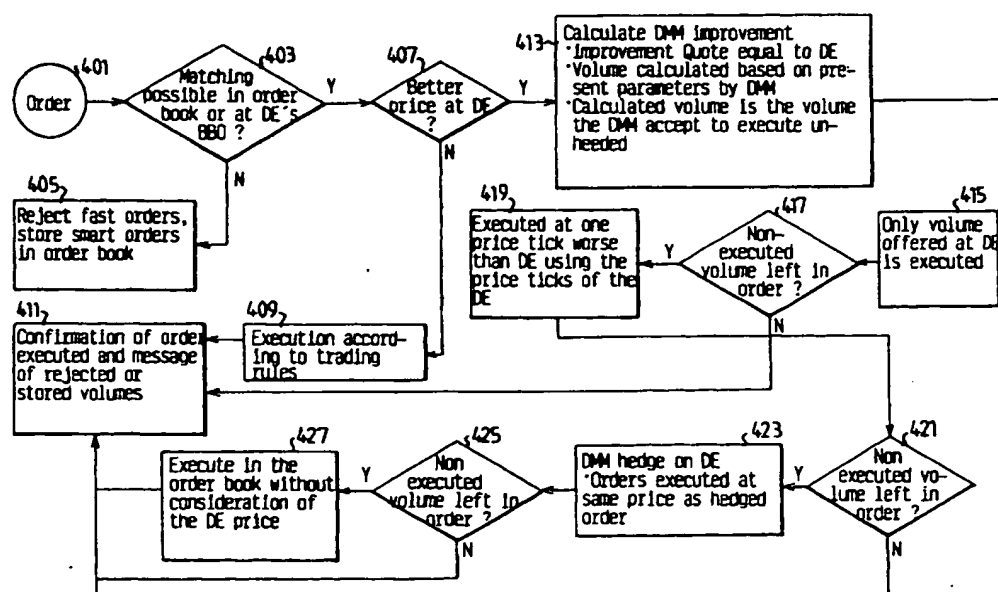
(57) Abstract: In an automated exchange system functions for automatic hedging and automatic price improvements are provided.

A TRADING SYSTEM

TECHNICAL FIELD
The present invention relates to an automatic exchange system, and in particular to the management of market maker quotes in such a system.

BACKGROUND OF THE INVENTION AND PRIOR ART
When designing automated exchange systems there is a constant demand for improvements, which increase liquidity, narrows the difference between bid and offer, the so called spread, and reduce the risk exposure for parties involved in the trading of instruments at the automated exchange.

For example, if prices on the market are changing the parties probably want to change their quotes. It is then of great importance that the changes can be made very quickly in order not to expose the parties involved to an unnecessary high risk. If changes can be made quickly the spread can be kept at a minimum and market makers or any other type of trader can accept the risk of placing orders in the order book.

Furthermore, a market maker has an obligation to quote, i.e. to have both a bid and an ask in the market most of the time during trading. When the market moves this obligation results in a requirement on the market maker to send new quotes to the exchange. If the same firm or person (or automatic quoting system) is a market maker in many instruments this will create a problem for the market maker. Hence, when the market moves fast a lot of quotes need to be sent. The result may be that the market maker needs to have a larger spread, i.e. the difference between the bid and the ask, in order to decrease the risk of not being able to re-quote fast enough to an acceptable level.

An efficient matching system should also have functionality to always do a best price available check before an order from a customer is matched. Also the customer order should be sent to another market, if the other market has a better price and the market maker can/do not want to do a price improvement. The International patent application No. PCT/SE99/01995 describes an automatic exchange system where, if an order can not match due to a best price checking functionality in the system, the order can automatically be sent to another exchange, where a better price is available.

SUMMARY

It is an object of the present invention to provide an improved automatic exchange system where market makers can change quotes more quickly and exposing themselves to a lower risk and at the same time keep a low spread.

It is also an object of the present invention to provide the market maker with a new function for automatic hedging. The function is used by the market maker to hedge in another market and then trade a customer order when the other market has a better price.

These objects and others are obtained by the present invention as set out in the appended claims.

Thus, when an order is entered into the system, i.e. an incoming order, the system will electronically, using computer aid, ensure that the order is traded at the best possible price using the following steps:

First, the system creates a list, sorted by price, of all offers (if the incoming order is to buy) or bids (if the

incoming order is to sell) for the same security on the Exchange at that time, which are within the price limit (if any) specified in the incoming order. Such a list if hereinafter termed the "Bid/Offer List". The Bid/Offer List will comprise of any ordinary limit orders in the order book at that time, as well as any quote given by the market maker for that particular instrument.

The system will then proceed to match the incoming order against the bids/offers in the Bid/Offer List. The order will first be matched with the best bid/offer in the Bid/Offer List, provided that this is equal to or better than the best bid offer on the designated exchange, i.e. the exchange to which the market maker sends quotes. Any unfilled balance of the order will then be matched against the second best bid/offer in the Bid/Offer List; and so on. This will continue until either the price limit given in the incoming order would be exceeded, or until the next bid/offer in the Bid/Offer List would be inferior to the best bid/offer given on the designated exchange as identified by the System at that time. In this matching process, multiple bids/offers at the same price will preferably be given priority based on time ranking.

However, ordinary limit orders in the order book preferably always have priority over a market maker quote at the same price, regardless of their relative time ranking.

If the entire order has not been filled following completion of these steps, the market maker according to a preferred embodiment must either:

(i) trade in an amount equal to the volume indicated in the designated exchange best bid offer less the volume already executed at the price indicated in the designated exchange

best bid offer (provided this price is within any price limit
specified in the incoming order) and then trade the remaining
unexecuted balance of the incoming order, if any, at "one tick
worse" than the price indicated in the designated exchange
best bid offer (provided this price is within any price limit
specified in the incoming order); or

(ii) (where the market maker wishes to pre-hedge) submit an
order to the designated exchange for a size equal to the
remaining unfilled balance of the original order.

The System will be able to automatically check which of these
options the market maker would like to select by reference to
trading parameters provided by the market maker throughout the
trading session.

If the market maker order is executed on the designated
exchange, the market maker is in a preferred embodiment
obliged to enter into a transaction (or transactions if the
market maker order was filled in parts) with the system. The
transactions are preferably executed using the trading rules
of the system at the same price (or prices) at which the
market maker order was executed and for the same volume (or
volumes). The corresponding incoming order will be filled
accordingly. If the market maker order cannot be executed on
the Designated Exchange, the incoming order will lapse.

Limit orders will be executed in the same way as fast orders
except that if a limit order is not immediately, executed in
whole in accordance with the procedures set out above, the
order (or any balance remaining) will rest in the order book.
The order will remain in the order book until it can be
executed, or until the end of the trading day, at which time
any remaining balance will lapse. Where two limit orders or a
limit order and a fast order submitted by a trading party are

matched by the system, a transaction will arise between the trading party who submitted one of the orders and the system. Also, another transaction will arise between the trading party who submitted the other order and the system.

Trading of shares will take place during the trading session for such shares: initially this will be only during the hours in which trading can take place in such shares on the relevant designated exchange. Prior to the opening of a trading session, the relevant market maker may input quotes during the pre-opening session. Preferably, no trading party orders may be submitted during the pre-opening session. Once the trading session is opened for trading a share, trading parties or market makers may submit orders.

BRIEF DESCRIPTION OF THE DRAWINGS
The present invention will now be described in more detail and with reference to the accompanying drawings, in which:

- Fig. 1 is a general view of an automated exchange system,
- Fig. 2 is a flowchart illustrating steps carried out in the system according to a first embodiment, and
- Fig. 3 is a flowchart illustrating steps carried out in the system according to a second embodiment.
- Fig. 4 is a flowchart illustrating matching steps carried out in an automated exchange in accordance with the invention.

DESCRIPTION OF PREFERRED EMBODIMENTS
In order make it possible for a market maker to set a quote without having to set a price the following steps are performed in an automated exchange system.

In the automated exchange system as shown in Fig. 1, having a number of parties connected thereto, such as customers and

market makers, there are two types of market maker quotes. Both can be used at the same time in the same instrument. However, in most applications, only one of each type is used in the same instrument at the same time.

The market maker has the possibility to send price quotes to order book. A quote is preferably a bid or ask quote with an attached volume. It has the same functionality as ordinary limit orders.

Also, the market maker may use a price improvement quote, which automatically creates a quote when necessary. Using such a market maker price improvement quote will result in that the market maker does not need to provide a price to the exchange. Instead the market maker assumes to have the same price as the designated exchange. Thus, the market maker price improvement quote can only be used when the designated exchange, i.e. the exchange to which the market maker sends its quotes, is open, since otherwise there is no price at the exchange. In the market maker price improvement quote the market maker preferably sets the following parameters:

- Instrument identification
- Bid volume multiplier
- Bid volume limit
- Offer volume multiplier
- Offer volume limit

Where the parameters are defined as follows:
- Bid (offer) volume multiplier - A multiplier specifying how many times the designated exchange volume the market maker is prepared to trade without hedging first. Note that the volume can be restricted by the Bid (offer) volume limit.

- Bid (offer) volume limit - the maximum volume the market maker is prepared to trade without hedging first. When the quote is used in matching the Bid offer volume limit is decreased.

There is also preferably a possibility for exchange staff and for the market maker to retrieve the information from the order book using query functionality.

Below trading and matching is described when the designated exchange is open.

The market maker can preferably enter the following order types
- market maker price Quotes, and
- market maker price improvement quotes as described above.

An incoming order tries to match with orders/quotes in the order book. If a match can not be done the order is rejected or stored in the order book.

An incoming order match with orders/quotes in the order book as long as the incoming order locks/cross with orders/quotes in the order book or the designated exchange best price. In case the incoming order has a better price (price cross) than orders/quotes in the order book, the price of the order/quotes in the order book is preferably used.

1. The incoming order matches with orders/quotes better than or equal to the designated exchange price.

2. In case there are volume to match of the incoming order and the competing exchange has a better price than the incoming order, the order tries to match with the market maker price

improvement quote. The price improvement quote is a quote calculated as a total volume that the market maker is prepared to match directly. If the calculated volume is larger then the rest of the incoming order there is a match. The execution prices are set as follows:

The same price as the best price of the designated exchange is used for the same volume at the designated exchange.

For the rest of the volume, the price is set one price tick worse using the designated exchange price ticks.

If the calculated volume is smaller than the remaining volume of the incoming order the market maker needs to hedge before trading the order. Hedging procedures are described below.

In case the hedging procedure has started other orders in the order book may trade.

The system preferably also has an automatic hedging function. Thus, there is a function for supporting creation of so called hedge orders. One or several market maker hedge orders are created and sent to the designated exchange. Hedge orders are preferably created using the following rules, where some steps are optional:
- Hedge orders are preferably created as immediate or cancel orders.
- Number and limit price of hedge orders is dependent on limit orders and price quotes in the order book. E.g. if the incoming order is a bid, the hedge orders created are depending on the limit orders/quotes on the offer side.
- All orders on the offer side better then the incoming orders limit price are summarized per price tick. One hedge order per price tick is created.

- If the incoming order has larger volume then the total volume in the order book, an order is created with the difference. The volume is set to the incoming orders limit price (a market order is created if the incoming order is a market order).

- For each price tick level where there are orders in the order book better then the incoming orders limit price (starting with the worst) one order is created. The order created has the same volume as the orders in the order book at that price tick. The order created has one tick better price tick then the orders in the order book (using the designated exchange price tick structure).

- In case the total volume of orders created exceeds the incoming orders volume to match, no more orders are created.

- Orders are sent to the designated exchange in the order they are created. All orders are first created and then sent in sequence as fast as possible.

Once all hedge orders have been sent to the designated exchange and have resulted in responses (trade or reject) the procedure is as follows:

- The incoming order is executed at the same prices and volumes as the market maker hedge orders where executed at.

- In case there are volume left of the incoming order it executes against any other orders in the order book.

- Any volume left of the incoming order is rejected (fast orders) or stored in the order book (limit orders)

Below, an example of a trading action is described with reference to Figs 2 and 3, where it is assumed that a Customer ("TP") sends in a new order to buy (the "Order").

	Price(s)	Corresponding size(s)
New TP Order to buy[a]	B	BS
Sell limit orders in the orderbook (from TP's)	$C_1, C_2, \ldots C_N$ where $C_1 <= C_2 <=$ etc.[b]	$CS_1, CS_2, \ldots CS_N$
The MARKET MAKER's current offer[c]	P	PS
The best offer on Designated Exchange ("DE")	D	DS
Size of one tick on the DE	T	

[a] *Price only applies if Order is a limit order. If a market order, all tests below involving B do not apply.*

[b] *Multiple C_i's at the same price are sorted based on time priority.*

[c] *The procedures below are independent of the procedures by which MARKET MAKER's set their quotes. In practice, for example, MARKET MAKERs may choose to instruct the system to always set P = D*

Step 1, define US as the balance of the Order yet to be filled. Initially, therefore, US = BS

Step 2, A "snapshot" is taken of D/DS, and is "frozen" in the order book together with the market maker's quote P/PS (even though in reality D/DS might change while the steps below are being executed). In other words the parameters are stored in the order book, while waiting for the processing of the steps below.

Step 3, Insert the market maker's offer P/PS into the sequence of C_i's so the sequence remains sorted from lowest to highest, e.g. C_1, C_2, C_3 _P_ C_N. Call this new series O_i, O_2 . . . O_M with corresponding sizes OS_i, OS_2 ... OS_M

Where offers are present from both TP(s) and the market maker at the same price, the TP offers are placed earlier in the sequence than the market maker offer. As a result, in the steps below the TP offers will be executed before the market maker offer.

Step 4, If the Order is a limit order and $O_1 > B$, then reject it (if it is a fast order) or store it (if it is a limit order)

Step 5, Beginning with $i = 1$, and continuing while $US > 0$ and $O_i < D$,

If $O_i > B$, reject remainder (if fast order) or store (if limit order)
Else, trade Order at O_i
$US = US - OS_i$

Step 6. The status now is: $US > 0$ and $O_i = D$

If $D > B$, reject remainder (if fast order) or store (if limit order)
Else, trade Order at D.
$US = US - OS_i$

Step 7. The status is now: $US > 0$ and there are no further TP offers or market maker offer to trade against

The market maker now has two options:

Trade max(0, DS - PS - BS + US) at a price of D **and,** if (D+T)
<= B, max(0, BS - US - max(0,DS - PS - BS + US)) at a price of
(D + T); **OR**
Send a buy order to the DE for size US, as set out below under
"Procedure for Sending an Order to the DE"
The system will know from the market maker's parameters
whether to choose option (a) or (b). See below.

P/PS and D/DS are "unfrozen" after the trade in option (a) is
complete, or before the order is sent to the DE in option (b).
Based on the fills returned from the DE, reduce US accordingly

Step 8. If US > 0 after step #7, reject remainder (if a fast
order) or store (if a limit order).

Notes:
The following steps are preferably executed immediately upon
receipt of any order and, if a limit order, even if the limit
is "away" from the best bid in the order book.

If the Order has been stored in order book after step #7, the
steps are re-executed as soon as the best offer in the system
matches B.

Below a procedure for Sending an Order to the exchange is
shown with reference to Fig. 3. It is to be noted that it is
not necessary to perform all steps. Some steps can be omitted
if the user so desires.

In the example given here, it is assumed that the order sent
to the DE is to buy US number of shares.

Step 11. Take all of offers in the system > D but <= B, and sort them from lowest to highest, e.g. in the sequence C_K, C_{K+1}, _ C_X with corresponding sizes CS_K, CS_{K+1}, _ CS_X

Step 12. If the market maker's current offer satisfies: D < P <= B;

Insert the market maker's current offer into the sequence of C_i's so the sequence remains sorted from lowest to highest, e.g. C_K, C_{K+1}, _P_C_X. Call this new series R_1, R_2 _ R_L with corresponding sizes RS_1, RS_2 _ RS_L.
Where offers are present from both TP(s) and the market maker at the same price, the TP offers are placed earlier in the sequence than the market maker offer. As a result, in the steps below the TP offers will be executed before the market maker offer.

Step 13. Define $NS_j = \Sigma RS_i$ (from i = 1 to j with 1<= j <= L). Define M as the smallest j such that US <= NS_j ; but US < NS_{j+1} (with M = L if no such j exists)

Step 14. The offers R_i / RS_i are "frozen" (stored) in the orderbook.
Step 15. The following orders are sent to the DE (in the sequence indicated):

If US > NS_M, buy (US - NS_M) shares at B (or at market if B not defined)
Buy (US - max(0, US - NS_M) - NS_{M-1}) shares at (R_M - T)
Buy RS_{M-1} shares at (R_{M-1} - T)
Buy RS_1 shares at (R_1 - T)
Once all of the fills in step #15 have been returned, reduce US based accordingly.

Step 16. Suppose that US is still > 0. In its order book, the system then executes the following trades (in the sequence indicated):

Buy $\min(US, RS_1)$ shares at R_1. Reduce US by the quantity filled.

Buy $\min(US, RS_2)$ shares at R_2. Reduce US by the quantity filled.

Buy $\min(US, RS_M)$ shares at R_M. Reduce US by the quantity filled

Buy US shares at B (or market if B not defined). Reduce US by the quantity filled.

Notes:

If the R_i /RS_i have been frozen in step #14 above, all of the above orders are guaranteed to be filled (except the last one, which becomes irrelevant).

Step 17. All orders frozen in step #14 above, but not traded in step #16, are unfrozen and returned to the order book.

In Fig. 4, an overview of the matching algorithm described above is shown. Thus, first in a step 401 an order is received in the automated exchange. Next, it is checked if it is possible to match the order in the orderbook or at the Best Bid/Offer at a Designated Exchange, step 403. If not, fast orders are rejected and smart orders are stored in the orderbook, step 405. If matching if possible it is checked if there is a better price at a Designated Exchange, step 407.

If the price at a Designated Exchange is not better than in the orderbook, the order is executed in accordance with the trading rules of the automated exchange, step 409 and the execution is confirmed, step 411.

If the price is better at a Designated Exchange, the automated exchange calculates the market makers improvement quote as described above, step 413. However, only the volume offered at the designated exchange offering a better price is executed, step 415.

Next, it is checked if there is any non-executed volume left of the order, step 417. If not, the execution is confirmed in step 411. If there is non-executed volume left, the remaining volume is executed at one price tick worse using the price ticks of the designated exchange, step 419.

Next it is checked if there is any non-executed volume left of the order, step 421. If not, the execution is confirmed in step 411. If there is non-executed volume left, an automatic hedge order is sent to the designated exchange and the order is executed at the same price as the hedge order, step 423 as described above.

Next it is checked if there is any non-executed volume left of the order, step 425. If not, the execution is confirmed in step 411. If there is non-executed volume left, the remainder of the order volume is executed in the orderbook of the automated exchange only, step 427, and the execution is confirmed in step 411.

By using the price improvement quote in an automated exchange as described above, the market maker does not need to re-quote when the market moves. The price is instead set by a reference to another execution point, such as another exchange or similar.

The automatic hedging procedure of the automated exchange described above makes it possible to create many hedge orders,

which can be sent to another exchange in order to protect orders in the designated exchange to which the market maker sends quotes. The advantage with such a system, as compared with, for example, the system described in the International patent application PCT/SE99/01995 is that orders within the order book at the designated exchange can be matched if orders can not be executed at the other exchange.

CLAIMS

1. A method of generating a quote in an automated exchange
   system, wherein at least one market maker has the
   possibility to have a quote in a particular instrument,
   comprising the step of:
   (a) automatically generating the quote in the automated
   exchange system as an improvement quote generated in response
   to the currently best price at a defined execution point.

2. A method according to claim 1, comprising the additional
   step of
   (b) generating the quote in response to parameter(s) set by
   the market maker.

3. A method in an automated exchange system where at least
   one market maker has the possibility to have a quote in a
   particular instrument, comprising the step of:
   (c) automatically creating hedge orders for the market maker.

4. A method according to claim 3, comprising the additional
   step of:
   (d) creating the hedge orders using an algorithm where orders
   in the order book of the automatic exchange system are checked
   thereby enabling a market maker to execute the incoming order
   at best available price.

5. A computer program, which when run on a computer, executes
   any of the steps a - d according to any of claims 1 - 4.

6. An automated exchange system, wherein at least one market
   maker has the possibility to have a quote in a particular

instrument, **characterized by** means for automatically generating a market maker quote in the automated exchange system as an improvement quote in response to the currently best price at a defined execution point.

7. A system according to claim 6, **characterized by** means for generating the quote in response to parameter(s) set by the market maker.

8. An automated exchange system where at least one market maker has the possibility to have a quote in a particular instrument, **characterized by** means for creating automatic hedge orders for the market maker.

9. A system according to claim 8, **characterized by** means for creating the hedge orders using an algorithm where orders in the order book of the automatic exchange system are checked.

10. A device for communication with an automated exchange system, **characterized by** means for transmitting parameter(s) set by the market maker used for generating an improvement quote in the automated exchange system in response to the currently best price at a defined execution point.

FIG.1

2 / 3

FIG.2

FIG.3

Order 401

Matching possible in order book or at DE's BBO ? 403
- N → Reject fast orders, store smart orders in order book 405
- Y → Better price at DE ? 407

Better price at DE ? 407
- N → Execution according to trading rules 409
- Y → Calculate DMM improvement 413
  - Improvement Quote equal to DE
  - Volume calculated based on pre-sent parameters by DMM
  - Calculated volume is the volume the DMM accept to execute un-heeded

Only volume offered at DE is executed 415

Non-executed volume left in order ? 417
- Y → Executed at one price tick worse than DE using the price ticks of the DE 419
- N → Non executed volume left in order ? 421

Non executed volume left in order ? 421
- Y → DMM hedge on DE 423
  - Orders executed at same price as hedged order
- N

DMM hedge on DE 423 → Non executed volume left in order ? 425
- Y → Execute in the order book without consideration of the DE price 427
- N

Execute in the order book without consideration of the DE price 427

Confirmation of order executed and message of rejected or stored volumes 411
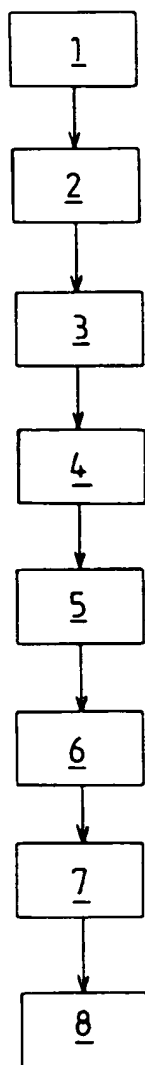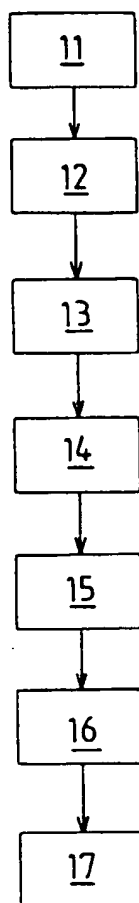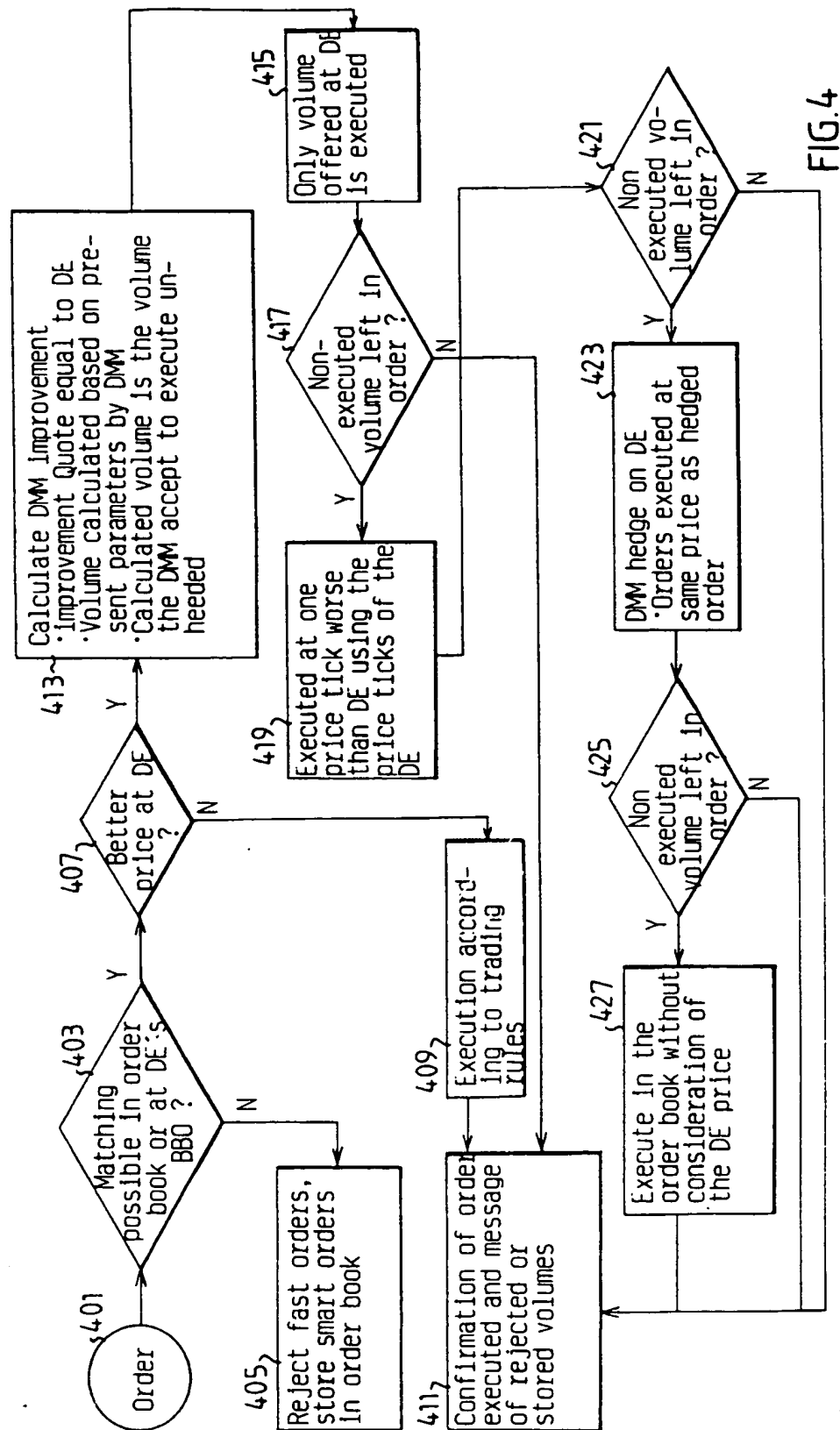
FIG.4

INTERNATION.JL SEARCH REPORT

International application No.
PCT/SE 01/00233

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: G06F 17/60, H04L 12/18

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: G06F, H04L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6014627 A (TOGHER ET AL), 11 January 2000 (11.01.00)	
A	WO 9708640 A1 (EBS DEALING RESOURCES, INC.), 6 March 1997 (06.03.97)	
A	US 5375055 A (TOGHER ET AL), 20 December 1994 (20.12.94)	
A	US 5963923 A (GARBER), 5 October 1999 (05.10.99)	

☐ Further documents are listed in the continuation of Box C.   ☒ See patent family annex.

*	Special categories of cited documents:
"A"	document defining the general state of the art which is not considered to be of particular relevance
"E"	earlier application or patent but published on or after the international filing date
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O"	document referring to an oral disclosure, use, exhibition or other means
"P"	document published prior to the international filing date but later than the priority date claimed

"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X"	document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y"	document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&"	document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
29 May 2001	1 9 -06- 2001

Name and mailing address of the ISA/	Authorized officer
Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86	Per-Olof Warnbo / JA A Telephone No. +46 8 782 25 00

Form PCT/ISA/210 (second sheet) (July 1998)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE01/00233

Box I	Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☒ Claims Nos.: **1-10**
   because they relate to subject matter not required to be searched by this Authority, namely:

   Schemes, rules or methods for doing business. After all, we have performed a novelty search and established an International Search Report.

2. ☐ Claims Nos.:
   because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
   because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II	Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest
☐ The additional search fees were accompanied by the applicant's protest.
☐ No protest accompanied the payment of additional search fees.

Form PCT/ISA/210 (continuation of first sheet (1)) (July 1998)

Patent document cited in search report			Publication date	Patent family member(s)			Publication date
US	6014627	A	11/01/00	AT	151899	T	15/05/97
				AU	658490	B	13/04/95
				AU	3605493	A	01/09/93
				CA	2129250	A	05/08/93
				DE	69309905	D,T	23/10/97
				DK	625275	T	20/10/97
				EP	0625275	A,B	23/11/94
				SE	0625275	T3	
				ES	2103467	T	16/09/97
				HK	1007354	A	00/00/00
				JP	2768828	B	25/06/98
				JP	7506916	T	27/07/95
				SG	46664	A	20/02/98
				US	5375055	A	20/12/94
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				WO	9315467	A	05/08/93
WO	9708640	A1	06/03/97	AU	714035	B	16/12/99
				AU	7105596	A	19/03/97
				CA	2228470	A	06/03/97
				CZ	9800598	A	17/03/99
				EP	0847561	A	17/06/98
				JP	11511578	T	05/10/99
				NO	980791	A	28/04/98
				NZ	318940	A	29/06/99
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				AU	658490	B	13/04/95
				AU	3605493	A	01/09/93
				CA	2129250	A	05/08/93
				DE	69309905	D,T	23/10/97
				DK	625275	T	20/10/97
				EP	0625275	A,B	23/11/94
				SE	0625275	T3	
				ES	2103467	T	16/09/97
				HK	1007354	A	00/00/00
				JP	2768828	B	25/06/98
				JP	7506916	T	27/07/95
				SG	46664	A	20/02/98
				US	5806050	A	08/09/98
				US	6014627	A	11/01/00
				WO	9315467	A	05/08/93
US	5963923	A	05/10/99	AU	7181598	A	03/06/98
				EP	1021777	A	26/07/00
				WO	9821667	A	22/05/98